DOCUMENT RESUME

ED 057 540 40 EC 040 820

AUTHOR Eaglstein, Solomon A.
TITLE The Effect of Interpolating Success Experiences into Classes for the Retarded. Final Report.
INSTITUTION Indiana Univ. Foundation, Bloomington.
SPONS AGENCY Bureau of Education for the Handicapped (DHEW/OE), Washington, D.C.
BUREAU NO BR-24-2086
PUB DATE Feb 70
GRANT OEG-242086-0029
NOTE 34p.

EDRS PRICE MF-$0.65 HC-$3.29
DESCRIPTORS Academic Achievement; *Educable Mentally Handicapped; *Exceptional Child Research; Failure Factors; Intermediate Grades; *Learning Characteristics; Mentally Handicapped; *Reinforcement; *Success Factors

ABSTRACT

The study was conducted to determine the effects of experimentally-arranged success and failure experiences on the subsequent performance of learning tasks by educable mentally retarded (EMR) students. Subjects were 68 EMR intermediate grade children, divided into four groups. Prior to the learning task on each of 5 subsequent days, subjects in the groups received a success experience on a paired-associate task (Success Group), a negative experience of failure on the same task (Failure Group), a neutral experience (Stimulus Control Group), or no experimentally-arranged experience at all (Class Control Group). The learning task following the intervention involved the teaching of seven spelling words per day. Results indicated no difference between groups and no effects on the learning task. Methodological and theoretical explanations of the findings were offered. Supplementary research appended suggested that intervention designed to give retarded subjects success or failure experiences does not affect their learning in other tasks to any great extent. (KW)

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FINAL REPORT

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THE EFFECT OF INTERPOLATING SUCCESS EXPERIENCES INTO CLASSES FOR THE RETARDED

Solomon A. Eaglstein

Indiana University Foundation

Bloomington, Indiana

February, 1970

EC 040 880

The research reported herein was performed pursuant to a grant with the Bureau for the Handicapped, U.S. Office of Education, Department of Health, Education and Welfare. Contractors undertaking such projects under government sponsorship are encouraged to express freely their professional judgment in the conduct of the project. Points of view or opinions stated do not, therefore, necessarily represent official position of the Bureau of Education for the Handicapped.

Department of Health, Education and Welfare

U.S. Office of Education
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ACKNOWLEDGEMENTS

I would like to express my appreciation to Mr. Ben Morgan, Director of Special Education, and the principles and teachers of the Indianapolis schools for their cooperation in the completion of this study.

My thanks also to Dr. Lawson Hughes and Dr. Samuel Guskin for their help in the editing of this report.

SUMMARY

The purpose of the study was to determine the effects of prior success and failure on the learning of educable mentally retarded children. It was hypothesized that prior success experiences would enhance the learning of Ss, while prior failure experiences would hinder learning when compared to the control groups who were given no prior reinforcement. The intervention of the experimental conditions was carried on for five days with the learning task given immediately after the intervention each day. The results indicated no learning effects or any differences between groups. Methodological and theoretical explanations of the findings were presented.

INTRODUCTION

A number of investigators has studied the effects of experimentally-arranged success and failure on the concurrent or subsequent performance of tasks by normal and retarded children. In general success has led to better performance than has failure.

Heber (1957) compared normal and retarded children on a button press task in which the success and failure experiences were concurrent to performance on the task. He reported that latency significantly decreased over trials for both normals and retardates whether the task was given either under success or under failure conditions. Further, under each condition, the latency decreased more for the retardates than for the normals. He found that there was no change in latency if neither success nor failure experiences occurred.

As a result of the unexpected effect of the failure condition of the Heber (1957) study (facilitation instead of hindering performance), Gardner (1958) tested two "degrees" of manipulated failure: partial and total. A series of three tasks was administered: a card sorting task to determine baseline behavior, a line drawing task contrived to interpolate failure experiences and finally a repetition of the card sorting task. In the partial failure condition the child was told that he had performed adequately on the first three of four line drawing problems and then told that he had failed on the fourth, thereby not obtaining a preselected prize. In the total failure condition all four of the tasks led to failure and hence no prize. The results were that the number of cards sorted increased significantly from the first to second sorting tasks for both of the failure conditions and both normals and retardates, but that the increase was significantly greater for the normals than for the retardates. Unfortunately it is not clear that the increase in card sorting accuracy was due to the prior experiences that were arranged rather than simply practice.

Steigman and Stevenson (1960) had normal children perform three heterogeneous tasks under one of two conditions of reinforcement prior to their performance of a discrimination learning task where all Ss were treated alike. There was no control group either which performed the latter task only or which was administered the three initial tasks under conditions of no reinforcement prior to the discrimination learning task. In the first reinforcement condition a child received six reinforcers out of a possible 36, while in the second he received 30 out of 36. The authors reported that prior high success led to significantly better discrimination learning than low success. As was the case with the Gardner (1958) study mentioned above, due to a lack of any control groups, interpretation of the results is tenuous.

Kass and Stevenson (1961) replicated the Steigman and Stevenson (1960) study with the addition of a group of retarded children and a control group in which only the discrimination learning task was given. The authors reported that prior high success led to significantly better discrimination learning than low success and that under high success conditions normals performed more efficiently than retardates. A comparison of the results of this study and the Heber (1957) study would seem to be questionable because of differences between Ss used (in Heber's study, Ss were considerably older and of lower IQ) and the use of different tasks (reaction time in Heber's study, discrimination learning in Kass and Stevenson's study).

One problem that seems to have plagued the studies mentioned above is the lack of adequate controls. For example, Heber (1957) pointed out that there were no significant latency changes if no type of reinforcement was delivered. There was however, no mention if the experimenter was absent or was seen by S and said nothing, or was interacting in some presumably neutral fashion. In the Gardner (1958) study and the Steigman and Stevenson (1960) study there were no control groups whatsoever. In the Kass and Stevenson (1961) study there was a control group which was not given the three pre-tasks but no control group in which these tasks were given under neutral conditions. Thus in the present study two types of control groups were used. One, to be termed the class control, was given no reinforcement before the experimental task; the children were taken directly from their classroom. The second, to be termed the stimulus control, was given a (presumed) neutral experience by E before the experimental task.

Further, in the present study an attempt was made to help clarify some of the disparate results thus far reported. In all of the studies in which the occurrence of success or failure by the child was arranged to ascertain what effect such occurrence had on subsequent performance, only one period of success or failure was given prior to the criterion measure. Since the children have experienced many failures over a period of years, it seems likely that a more reliable measure of behavior was desirable. Thus even though all of the studies detected some effect, in the present study experimentally arranged successes and failures occurred over a period of five days, with the experimental task given each day immediately after the occurrence of the success or failure experience.

It was hypothesized that in the present study, the success group would evidence more learning than either the failure or control groups.

METHOD

Design

A 4X5 factorial design was used with the independent variables (a) interpolated experience (success, failure, class control or stimulus control), (b) trials (one per day for five days).

Subjects

Sixty-eight educable mentally retarded children were obtained from intermediate special classes of the Indianapolis, Indiana, school system. No Ss exhibited gross sensory or motor impairments. The children were randomly assigned to either the success (S), failure (F), class control (CC) or stimulus control (CS) groups. Mean IQ and CA of each group are presented in Table 1. Significant differences appeared in CA and were taken into consideration when the data was statistically analyzed.

Table 1

Mean IQ and CA of the four groups of subjects

Group	N	Mean CA (years)*	Mean IQ
Success	17	11.53	68
Failure	17	11.88	69
Stimulus Control	17	11.47	71
Class Control	17	12.12	69

* $p < .05$

Experimenters

Four experimenters were used to test Ss with each experimenter testing an approximately equal number of Ss in each of the four groups.

Apparatus

The success and failure experiences were induced via paired-associate (PA) tasks. The pairs were: colored discs and letters, colored discs and shapes colored discs and numbers, numbers and letters, and numbers and shapes. The colors for the F group were red yellow, brown and blue; for the S group, red, green, brown and blue. The pairs and single presentations were prepared on sepia and multicolor diazo film and mounted as 35mm slides for presentation on Kodak Carousel projectors. The 35 spelling words used for the learning task were administered on tape, seven per day (Appendix A). The slide sets and spelling words were chosen each day at random without replacement for each S.

Experimental intervention and dependent measure

For each day of the five day intervention period the Ss in the F and S groups were presented a different randomly assigned set of the PA 35mm slides mentioned above before the spelling word learning task. The Ss in the CC group were presented only the learning task each day. The CS group was given another set of slides to be described below. The purpose of the slides was to give the success or failure experiences to Ss. Each S was escorted from his classroom to the testing room by E and individually tested. After being seated in front of the projection screen, the following instructions were given on the first day to the F and S groups:

> I'm going to show you some slides that have two objects on them. I want you to learn them both so that when I give you one of them alone you can tell me which one went with it. So try and remember how the objects go together.

On subsequent days the following instructions were presented before the slides:

> Hi, you remember that I showed you some pairs of things and I wanted you to remember how they go together. I want you to do the same thing today.

On the first day that the set of slides containing the colored discs as stimulus items were presented, the following instructions for color labeling were given:

> (Child's name), we're going to look at some new slides today. For the first few slides I want to make sure that you know your colors. (E turned on the projector). What color is this? (If correct, E responded "OK"; if

incorrect, S was corrected. This was repeated until the color name was learned. The next slide was then presented and the same procedure followed.)

Each day 12 pairs (in three blocks of four) were presented to the Ss in the S and F groups. After a block of four pairs was presented, one at a time, the single stimulus items were projected on the screen. Ss' task was to recall the other item of the pair. In the S group it was the intention to give as much positive reinforcement as possible. In the F group it was the intention to give as much negative reinforcement as possible. In the S group, Ss were asked to verbalize twice the stimulus pairs with E. Each block of four pairs was repeated three times before the single items were presented in order to ensure a correct response to the single stimulus items. After every correct response, E said "You're doing very well today", or "you haven't missed any today" or "that's (five) right in a row, you're doing well." Whenever an incorrect response was made, attention was called to the fact that the task was difficult and that errors were to be expected, but that S was still performing excellently. In the F group no verbalizing was allowed, nor were the blocks the blocks of four repeated. Whenever S made an incorrect response, a negative statement was made by E, e.g. "You're not doing too well today." or "you've missed three of these four, that's not very good, is it?" In addition the color discrimination for the F group was much more difficult than for the S group.

In the CS group a different series of 12 slides were shown each day. On the slides were pictures of birds, farm animals, university buildings or abstract drawings. The interaction between S and E was limited to E's answering questions posed by S and other neutral comments. It was desired that neither positive nor negative reinforcements be delivered by E as the purpose was to determine whether the presence of E before the learning task would affect the behavior of S on that task as compared to a control group in which Ss were escorted to the testing room and immediately given the learning task.

Each day immediately following the intervention period, a tape recorder was switched on which presented the spelling words. The words were from a Silver-Burdette reader of the fourth-grade level and were selected in a pilot study from a list of 150 words on the basis of having the greatest variance of correct-incorrect spellings by the pilot Ss. The pilot Ss were of comparable IQ and CA as the Ss in this study.

The following instructions were presented on tape on day one:

> We're going to work with some spelling words today. I'm going to say a word, then spell it, say it again, and spell it again, then I want you to write it down on this piece of paper. Now do you understand? I'll say, spell, say and spell the word again and then you write it down. OK, here is the first word.

During the time that the tape was running, all four groups were treated alikce, namely, E was in the room but said nothing to S. There was a 30 second delay between words; no Ss complained of not having enough time to write down the words. After the seven words were completed, S was conducted back to his classroom.

On subsequent days the following instructions were given to Ss before the words were presented:

> You remember from our last visit that I will say and spell the words twice and then you will write them down. OK, here is the first word.

RESULTS

The following criteria were used to assess the spelling performance of the children. Five points were given if the word was correctly spelled; four points for all the letters, but in the wrong order; three points for the majority of the letters in the correct order; two points for the majority of the letters in the wrong order; one point for the minority of the letters in the correct order. One point was deducted if one or two extra letters were inserted and two points were deducted for three or more extra letters.

Analysis of covariance of the spelling scores is shown in Table 2. The adjusting variable of the analysis was CA of Ss.

Table 2

Analysis of covariance of the spelling scores

Source	MS	df	F
Between Ss			
Conditions (C)	.66	3	
error	6.23	64	
Within Ss			
Trials (T)	1.02	4	2.32
T X C	.63	12	1.43
error	.44	255	

There were no significant effects in the data (although both the effects of trials and trials X conditions approached the .05 confidence level).

The adjusted cell means for each group over the five days is presented in Table 3. It is apparent that the means do not fall in the predicted direction, the failure group doing as well as the success group and the controls doing about the same if not better.

Table 3

Adjusted mean spelling scores over the five days for each group

Groups	Days: 1	2	3	4	5	Mean
Success	2.69	2.92	3.21	3.04	3.05	2.98
Failure	3.05	2.97	3.49	2.88	3.07	3.09
Stimulus Control	2.70	2.91	3.14	3.17	3.33	3.05
Class Control	3.27	3.16	3.04	3.41	3.23	3.22
Means	2.93	2.99	3.22	3.12	3.17	

DISCUSSION

It seems plausible that no learning took place due to a lack of novelty of the spelling words to Ss. As 31 of the 68 Ss in the study began with average spelling scores of 3.0 or above on day one, a ceiling effect may have been working against the study from the outset. An analysis of covariance was performed with day one as the adjusting variable (a day one analysis of covariance revealed no significant differences between the four groups), but here also no significant differences were found, giving more evidence for this ceiling effect.

In addition due to possible dissimilarities between the task used to induce the success and failure experiences, and the dependent variable there may have been no generalization from the success or failure experiences to the dependent variable. The children may have regarded the two tasks as completely separate so that the experiences on the PA tasks in no way affected the performance on the spelling task.

Finally, studies in the past have used relatively easy tasks as the dependent variable (button press, card sort, simple discrimination). These tasks were also novel and thus possibly not as resistant to experimental interventions as would be a spelling task which is familiar to special class students. In other words, it may take a considerably larger number of intervention periods before any effect is evident on a regular classroom activity, an activity in which the child has had years of continued failure experiences rather than a novel, relatively easy task which has had no history of either success or failure.

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Steignman, M., and Stevenson, H. The effects of pretraining reinforcement schedules on children's learning. Child Development, 1960, 31, 53-58.

Appendix

Appendix A

Spelling words used in the learning task

	Days				
	I	II	III	IV	V
1	motel	igloo	chicken	chatter	startle
2	jelly	stray	sniff	great	order
3	walnut	whack	leave	patch	snake
4	final	through	flirt	glove	build
5	stable	sharp	every	check	adorn
6	swamp	fudge	falter	orchid	cherry
7	gather	scurry	trail	haunt	paint

Report of Supplementary Research

INTRODUCTION

Zigler (1966) has conjectured that because of the retarded child's past history of failure and his negative encounters with adults, the child has developed a "negative reaction tendency" that includes a wariness of adults in social interactions. In this and other studies, Zigler has used a marble-drop ("cosatiation task") to determine under what conditions this wariness will be manifested. The task consists of two parts that are highly similar in the response required of the child. In part one, the child is instructed to drop marbles of one color into one of two holes in an apparatus before him and the marbles of a second color into the other hole. The child is instructed to play as long as he wishes and is given positive reinforcement for every tenth marble dropped without respect to its color. In part two marble colors are reversed with respect to the holes. Zigler has found (e.g., 1958) that retarded children as a group tend to play longer on part two than on part one, while just the opposite results have been obtained with normal children. Zigler (1958) conjectured as to the origin of these results as follows:

> Institutionalized feebleminded subjects begin task one with a positive reation tendency higher than that of normal subjects. This higher positive-reaction tendency is due to higher motivation of feebleminded subjects to interact with an approving adult. At the same time feebleminded subjects begin task one with a negative-reaction tendency higher than that of normals. This higher negative-reaction tendency is due to a wariness of adults which stems from the more frequent negative encounters that feebleminded subjects experience at the nads of adults, if task one is given under a support condition the subjects' negative-reaction tendency is reduced more during task one then is his positive reaction tendency.

Zigler hypothesized that the child reappraises the situation in part one; the child comes to see this particular adult as different from those in the past with whom he has had negative encounters. Thus when approaching part two the child has a lowered negative-reaction tendency and plays longer than on part one. Subsequently, results similar to those obtained by Zigler (1958) have occurred in several additional studies (e.g., Shallanberger and Zigler, 1961; Berkowitz and Zigler, 1965).

Butterfield and Zigler (1965) investigated the effect of prior success and failure on the subsequent performance of normals and

retardates on a partially reinforced three choice discrimination task. The normals and retardates were divided into the following three groups: success, in which the child was praised for his performance on two games prior to the discrimination task; failure, in which the child was reproved for his performance on the two games; control, in which no reinforcement was given prior to the discrimination task. It was reported that the success and failure conditions equally enhanced learning of the normal and retardates as compared with the control condition. There were no significant differences due to type of S nor any interaction between conditions and Ss. In another experiment within the same study one additional variable was added, namely, responsivity to social reinforcement (RSR). Ss were categorized as high or low on this variable one year prior to the experiment in terms of how long they played on a cosatiation task. As in the first experiment, the success and failure conditions equally enhanced the performance of normals and retardates over the controls. The only significant difference reported was a three-way interaction between type of S, conditions and RSR. Zigler concluded that the diversity of findings within the success-failure literature may have been due to the lack of control of such individual difference variables. The measure of social responsivity was incorporated into the present study as a pre- and posttest measure first as a further test of Zigler's hypothesis and secondly to determine whether the experimental interventions would change the playing times for parts one and two of the cosatiation task.

In view of the fact that retarded children have a history of less success than normal children, it seems reasonable to assume that retarded children approach most problem solving situations with a lower expectancy of success than normal children. Such expectancies may be measured on a level of aspiration (LOA) task.

For example, Atkinson and Litwin (1960) found that in a ring-toss LOA task, college students with low tendencies to avoid failure (as measured by the Mandler-Srason Test Anxiety Questionnaire) and high tendencies to achieve success (as measured by the French Test of Insight) more often chose a position closer to the mean distance from the target than did college students with high tendencies to avoid failure and low tendencies to achieve success. Sears (1940) reported that normal fourth- to sixth-graders with unsuccessful school histories set unrealistically high or low goals in a task where latency to produce synonyms was the LOA measure, as compared to children with successful school histories. These unrealistic goals were in terms of the child's verbalizing very long or very short latencies when asked for such latency expectancies from E. The unrealistic high or low goals set by the children were explained in terms of the child's past history of reinforcement and the social pressures on persons to improve performance and set goals increasingly higher with a certain task.

If the unsuccessful school histories of the normal children of the Sears study may be seen as the analogue of the past history of failure of retarded children, it would seem plausible that E's deliberate arranging that the retarded child should experience success might raise the retarded child's subsequent expectancy of success. In the present study, it was predicted that success and failure interventions would respectively raise and lower the LOA of retarded children.

Another finding of the Atkinson and Litwin (1960) study was the relationship between failure-avoiding/success-achieving and both the grade and the amount of time spent by their college-student Ss on the final test of the sophomore class in which they were enrolled. Those students who scored high on the success-achieving scale spent more time on the examination and achieved higher grades than those students who scored high on the failure-avoiding scale. These findings are similar to those of Kagan et al. (1966) with first grade children. Kagan investigated conceptual reflectivity-impulsivity as measured on tasks of inductive reasoning. In one of these tasks, Matching Familiar Figures (MFF), the child is instructed to match one of a presentation of six variants to a standard picture. Kagan reported a significantly high negative correlation between latency of first response and number of errors before correct choice. MFF was also included in the present study before and after the five day intervention period for two reasons. First, this was done to determine if retarded children behave on MFF as normals. Anecdotal evidence from a study by the present author (1969) suggests that changes in Ss' latency may enhance learning efficiency. For example, one child's initial rapid responding was inhibited with a resulting increase of correct responses on a discrimination learning task; another child's initial slow responding was hastened with the similar result of enhancing performance. Secondly, MFF was included in this study to determine whether the success or failure manipulations have any effect on either the number of errors to find the correct choice or on the latency, from pre- to posttests, i.e., whether the interventions generalize their effects to tasks other than the learning task.

METHOD

Subjects

The Ss were the same as those used in the main study. Please refer back for the CA and IQ information.

Apparatus

The MFF task was a Xerox copy of the thirteen items used by Kagan (see Plates 1 and 2). The LOA task consisted of a square four-winged device with a hole in the center and was placed over a wastebasket into which a shuttlecock was to be thrown (see Fig. 1). The wings were at an angle so that if placed in one position the slope led down to the hole and if turned upside down, the slope would lead down away from the hole.

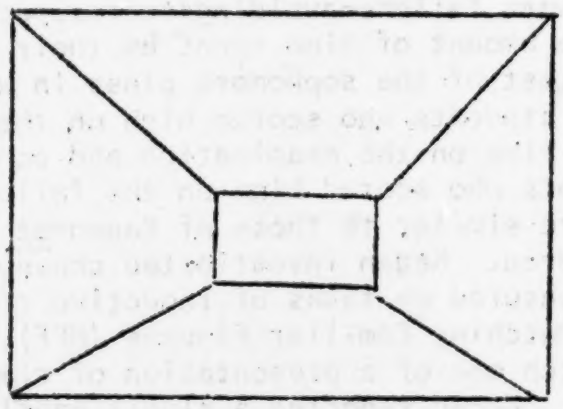


Fig. 1. Level of aspiration apparatus

The apparatus for the marble-drop (see Fig. 2) was very similar to that described by Berkowitz and Zigler (1965). It consisted of a grey box with two one inch diameter holes 6 inches apart, between and below which was another one inch hole. The interior of the box consisted of a foam padded runway which funneled the marbles from the upper holes to a small container below the lower hole. This container contained 20 green and 20 yellow marbles to ensure a steady supply to S.

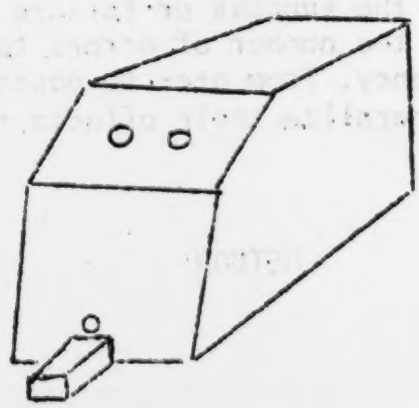


Fig. 2. Marble-drop apparatus.

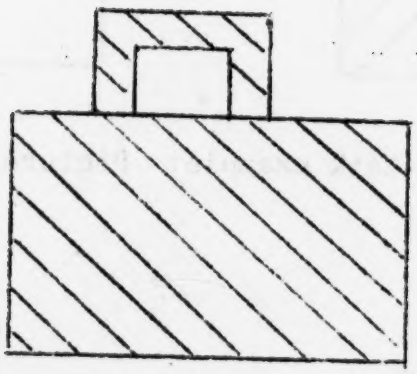


Plate 1. MFF task: Example of standard picture

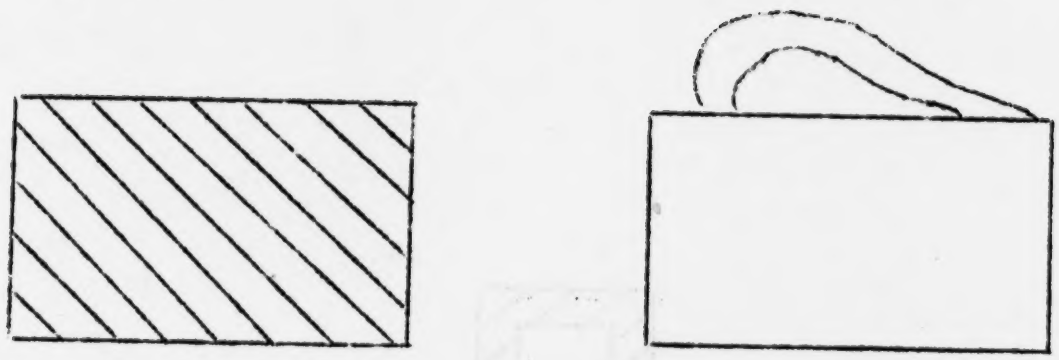
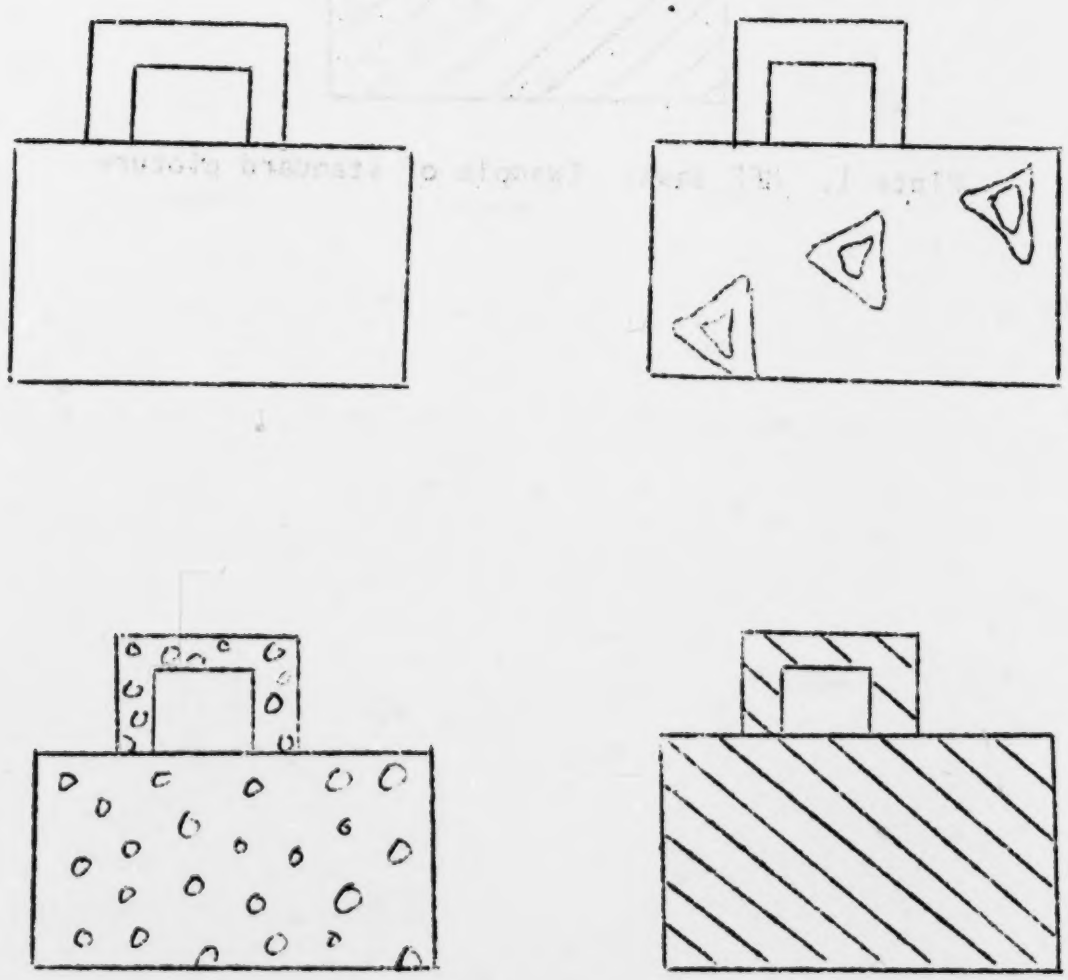


Plate 2. MFF task example: Picture of six variants.



Procedure

E went to the child's classroom and conducted him to the testing room in which the LOA apparatus was assembled. E gave the following directions:

> (Child's name), you see this thing with a hole in the top? I want you to take this birdie and throw it in that hole. I want you to stand anywhere along this line where you are sure you can throw this birdie into the hole.

E gave the shuttlecock to S who stood on a chalk line drawn on the floor. After having thrown the shuttlecock, S was seated by a table and E gave the following instructions for the MFF task*:

> I am going to show you a picture of something you know and then some pictures that look like it. You will have to point to the picture on this bottom page (point) that is just like the one on this top page (point). Let's do one for practice. (E shows one practice item and helps the child to find the correct answer.) Now we're going to do some that are a little bit harder. You will see a picture on top and six pictures on the bottom. Find the one that is just like the one on top and point to it.

E recorded latency to first response to the half-second, total number of errors for each item and the order in which the errors were made. Whenever S was correct, E praised. Whenever S was incorrect E said, "No, that is not the right one. Find the one that is just like this one." Following this task E gave the following instructions (identical with instructions used by Butterfield and Zigler, 1965):

> This is a game we call Marble-in-the-Hole, I'll tell you how to play it. You see these marbles (E points to the power opening). Some of them are green and some are yellow. They go in these holes (E points to upper two holes). The green ones go in this hole and the yellow ones in this one (E points to the appropriate holes). Now you show me a green marble. Put it in the hole it goes in.

*The MFF task and directions were obtained from Kagan.

Now show me a yellow marble. Put it in the hole it goes in. You can put as many marbles in the holes as you want to. You can stop whenever you want to. You tell me when to stop. Remember, when you want to stop just tell me.

AFter every tenth marble was inserted the experimenter randomly made one of the following four statements: "You really know how to play this game." "That's fine," "You really know how to play Marble-in-the-Hole, don't you?" and "Very good." He also smiled and nodded at the subject throughout the game. The subject played until he indicated that he wished to stop, either by telling the experimenter that he wished to do so or by not inserting a marble for 30 seconds. At this point the experimenter instituted Part II of the game, saying:

Now I'll tell you how to play this game. This time we put the yellow marbles in this hole and the green marbles in this one (opposite holes to those employed in Part I). Put a yellow marble where it goes. Now put a green marble where it goes. You can put as many marbles in the holes as you want to. You can stop whenever you want to. You tell me when you want to stop. Remember, when you want to stop, just tell me. OK? Ready, begin.

RESULTS

Impulsivity-Reflectivity

Table 4 shows the correlations between errors made in finding the correct choices on the MFF and the latency to the first choice for both pre- and posttest.

Table 4

Correlations between errors and latency on pre- and posttests for the four groups

Group	Pretest	Posttest
Combined data	-.53**	-.03
Success	-.61**	-.55**
Failure	-.40*	+.50*
Class Control	-.57*	-.67**
Stimulus Control	-.56*	-.43*

* $p < .05$
** $p < .01$

The results of the combined groups data indicate that on the pretest measures there was a significant negative correlation between latency and errors, but that after the experimental interventions this correlation significantly decreased ($p < .01$). In the success group both the pre- and posttest correlations between errors and latency were significantly negative but were not different from each other. On the contrary, the failure group pretest correlation was significantly negative, but significantly increased ($p < .001$) to a significant positive correlation. This positive correlation was due to changes in both latency and errors within Ss. There was no evident pattern in the direction of the change in either latency or errors. Both of the control groups' pre- and posttest correlations were significantly nagative with no significant changes in the two testings.

Regression analysis of the data revealed the following results. The combined group data for the pretest showed a significant linear trend ($F = 26.23$, $df = 1/67$, $p < .0005$), while the posttest showed a significant cubic trend ($F = 6.11$, $df = 3/64$, $p < .001$). The S group, pre- and posttest data showed significant linear trends ($F = 8.86$, $df = 1/15$, $p < .01$; $F = 6.55$, $df = 1/15$, $p < .025$). The F group showed a significant quintic trend on the pretest ($F = 3.43$, $df = 4/12$, $p < .05$) and a significant cubic on the posttest ($F = 22.73$, $df = 3/13$, $p < .0005$). The CS group showed a significant linear trend on the pretest ($F = 6.73$, $df = 1/15$, $p < .025$), and no significant trend components on the

posttest.* The CC group changed from a significant linear trend on the pretest (F - 7.06, df = 1/14, p .025) to a significant quadratic trend on the posttest (F = 6.42, df = 1/13, p .05). (See summary, Table 5)

Table 5

Best fitting curves: MFF data for the four groups

Group	Pretest	Posttest
Combined	Linear	Cubic
Success	Linear	Linear
Failure	Quintic	Cubic
Stimulus Control	Linear	No significant fit
Class Control	Linear	Quadratic

Respnsivity to Social Reinforcement (marble-drop)

Table 6 shows the mean playing times on parts one and two and totals for each group on the marble-drop task. There were not significant differences between playing times on parts one and two in either pre- or posttest. Neither were there any significant changes in playing times from pre- to posttest.

*The analysis was carried out to the seventh degree polynomial.

Table 6

Mean playing times (minutes) on the marble-drop task for the four groups

	Pretest			Posttest		
Group	Part I	Part II	Total	Part I	Part II	Total
Combined	5.54	4.58	10.12	5.59	5.34	10.93
Success	4.53	2.75	7.28	3.99	3.57	7.56
Failure	5.51	3.96	9.47	6.83	4.80	12.28
Class Control	3.99	3.84	7.83	4.01	5.73	9.74
Stimulus Control	8.13	7.78	15.91	7.54	7.25	14.79

Level of Aspiration

Table 7 shows the transformed mean distance from the goal box for pre and posttests. The transformation of the raw data was performed by the following formula:

Transformed score = median - (raw score - median), for all raw scores greater than the pretest median performance. For all raw scores less than the median no transformation was performed. In effect, the transformation folded the distribution in the middle and placed the persons furthest from the goal box in the same numerical category as those persons nearest. Thus, when the pretest distance was subtracted from the posttest distance, a positive remainder indicated movement toward the median, a negative remainder indicated movement away from the median.

Table 7

Mean transformed distance (feet) from the goal box for the four groups

	Success	Failure	Class Control	Stimulus Control
Pretest	5.98	5.73	5.87	5.74
Posttest	6.39	5.78	5.04	5.73
Difference	.41*	.05	- .83*	- .01

*p < .05

The S group moved significantly toward the median, whereas the CC group moved significantly away from the median. There were no significant differences for the stimulus control or failure groups.

An analysis of the untransformed scores (see Table 8) revealed no significant differences between the four groups on either the pre- or posttests. Within groups, while all groups showed movement away from the goal box, only the S group showed significant movement.

Table 8

Mean distance (feet) from the goal box for all groups

	Pre	Post	Difference
Failure	6.41	7.00	.59
Success	5.71	7.41	1.70*
Class Control	6.41	7.76	1.35
Stimulus Control	5.88	7.00	1.12

*p < .05

DISCUSSION

The results from the pretest of the inductive reasoning task (MFF) indicated first of all that Kagan's (1966) notion of conceptual reflectivity-impulsivity extends into retarded populations, and secondly that the negative relationship between errors and latency can be significantly altered.

As there were no normal Ss in this experiment, it cannot be said of certainty whether the magnitude of the correlation in this study with retardates (-.53 pretest) is comparable to that of normals (although Kagan reported a correlation of -.56 with a group of normal first grade boys and a -.63 with a group of normal first grade girls).

From the LOA results it may be inferred that interpolated success experiences can change the subjective attitudes of retarded children from that of failure avoiders to that of success achievers. The interesting result was that the CC group showed a change towards failure avoidance from pre- to posttesting. Although the change of these two groups was statistically significant, the actual magnitude of the change was very small (seven inches for the S group, ten inches for the CC group). This might suggest that the change in LOA was small.

The results from the marble-drop task did not confirm Zigler's (1958) results of different average playing times for parts one and two by retarded Ss. Nor was there any appreciable change in playing times after the intervention period. It is possible that Zigler's formulations do not extend to all populations.

In summary, this study suggests that the intervention of experimental treatments designed to give retarded Ss success of failure experiences will not affect their learning in other tasks to any great extent.

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